MAKE OR BUY ANALYSIS FOR COOKED SAUSAGE PRODUCTS

by

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ABSTRACT

Johnsonville Sausage is a privately held company based in Sheboygan Falls, WI. The company has a growing cooked sausage business and is evaluating options to expand capacity. Investing in either of two existing facilities or outsourcing production to a co-manufacturer is being considered in this make versus buy analysis. Intense competition in the category and uncertain raw material markets are considerations in the evaluation.

Data used for the analyses were obtained from Johnsonville sources. Assumptions for the "make" analyses were based on existing data where applicable such as labor and utilities, and in other cases assumptions were made based on company knowledge of the process. Johnsonville engineers worked closely with equipment vendors to develop the building and equipment investment plan. Data for the "buy" alternative were received from a prequalified co-packer with advanced manufacturing technology.

A Net Present Value (NPV) model is developed for each alternative and used to determine financial viability of each. The models consider varying investment requirements, freight rates and cost of goods for each alternative. Sensitivity analyses are performed to address key variables such as raw material prices and sales volume.

The paper concludes that investment in Sheboygan is a viable option; however, the investment poses risk if raw material prices rise and or volume declines from expected projections. Therefore, the recommendation is to outsource production and initiate the Sheboygan project when the co-packed volume reaches 15 million pounds.

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CHAPTER I: INTRODUCTION

Johnsonville Sausage is a privately held company currently operated by the second generation of the founding family. The company was founded in 1945 in the small town of Johnsonville, WI. The business originally operated as a small butcher shop performing custom slaughter for local farmers and selling various cuts of meat, ground meat and sausages. The second generation assumed leadership of the company in the late 1970s and transitioned the business from regional retail outlets to wholesale distribution. During the ten year period beginning in 1985, the company expanded distribution from six states to all 50 states in the U.S.

Today, Johnsonville is an international marketer and distributor of sausage products. Its products are sold in 25 countries and there are manufacturing operations in the U.S. and Europe. Innovations in marketing, manufacturing and workforce development paved the way for the company's accelerated growth.

1.1 Products and Channels

As the company tag line suggests "Sausage is all we do", the focus is on manufacturing and marketing exceptional sausage products (Johnsonville Sausage 2011). Johnsonville's product offerings are categorized into four primary sausage groups – uncooked bratwurst, uncooked Italian sausage, uncooked breakfast sausage links, and cooked smoked sausage links. Distribution channels include retail, club store, foodservice and international. U.S. retail is the most mature channel and is by far the largest in both volume and revenue. While revenues from the club, foodservice and international channels are much lower, all have experienced significant growth the past few years. Johnsonville's strategy to focus on

sausage has paid dividends as the company has the top market share in every category it competes.

1.2 Smoked Sausage Category

According to AC Nielson data, the retail smoked sausage category is about a $1.1 billion category and grew by 5.6% in 2009 over 2008 (Nielsen 2010). The category is divided into rope sausage and link sausage segments. Johnsonville competes in the link sausage segment and is the leading brand. The link category is about a $600 million category. The competition consists of several regional brands, private label and a second national brand. Johnsonville's percent dollar share is double the second national brand in the link category.

Johnsonville's volume in the link category doubled during the five year period beginning 1999 and has grown steadily since then. Competition has been strong but Johnsonville's business has remained profitable. Sales volume has grown to a point where consideration of additional production capacity is needed.

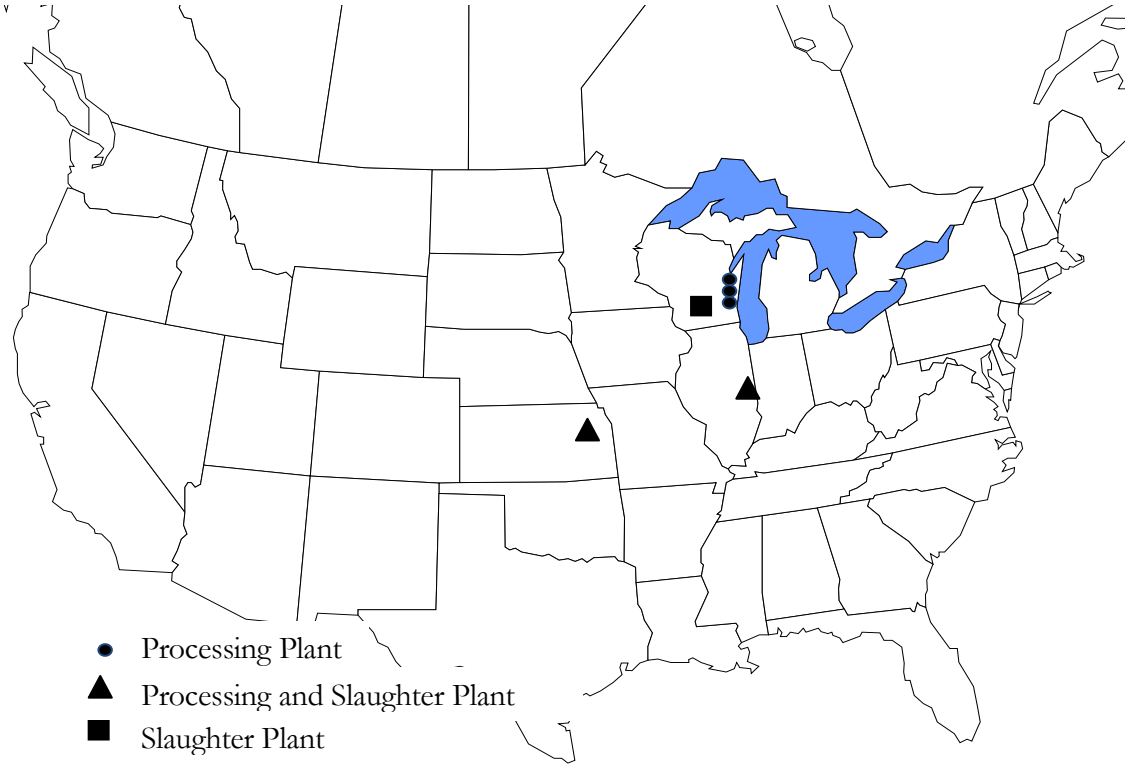
1.3 Manufacturing Network

Johnsonville's manufacturing network has evolved from a local butcher shop to six company operated facilities and an extensive contract manufacturing (co-pack) network. Johnsonville's factories are located in Wisconsin (4), Illinois (1) and Kansas (1). Network expansion began in the late 1970s with the construction of a new factory to support the growth in fresh sausage and smoked sausage categories. This plant eventually became dedicated to fresh sausage production and with several additions over the years is the largest plant in the network. In the early 1980s, the first slaughter facility was purchased and a second slaughter facility was added in the mid-1990s. In the mid-2000s, a third

slaughter plant was added to the network. During the same period, a new plant was constructed for smoked sausage production. The development of the co-pack network began in the mid-1990s.

The six Johnsonville plants have varying capabilities. Two of the three slaughter plants produce finished goods. The slaughter locations are in Illinois, Kansas and Wisconsin with Illinois and Kansas locations also producing fresh finished goods (Figure 1.1). The other three facilities produce finished goods only. As previously mentioned, the largest finished goods facility is located in Wisconsin and is dedicated to fresh sausage production. Also in Wisconsin are two facilities tooled to produce smoked sausage products. The network relies primarily on the newest smoked sausage facility for the bulk of the production. This plant is nearing production capacity requiring the company to decide to co-pack excess volume or invest to add capacity to meet the business needs.

Figure 1.1: Johnsonville Manufacturing Network

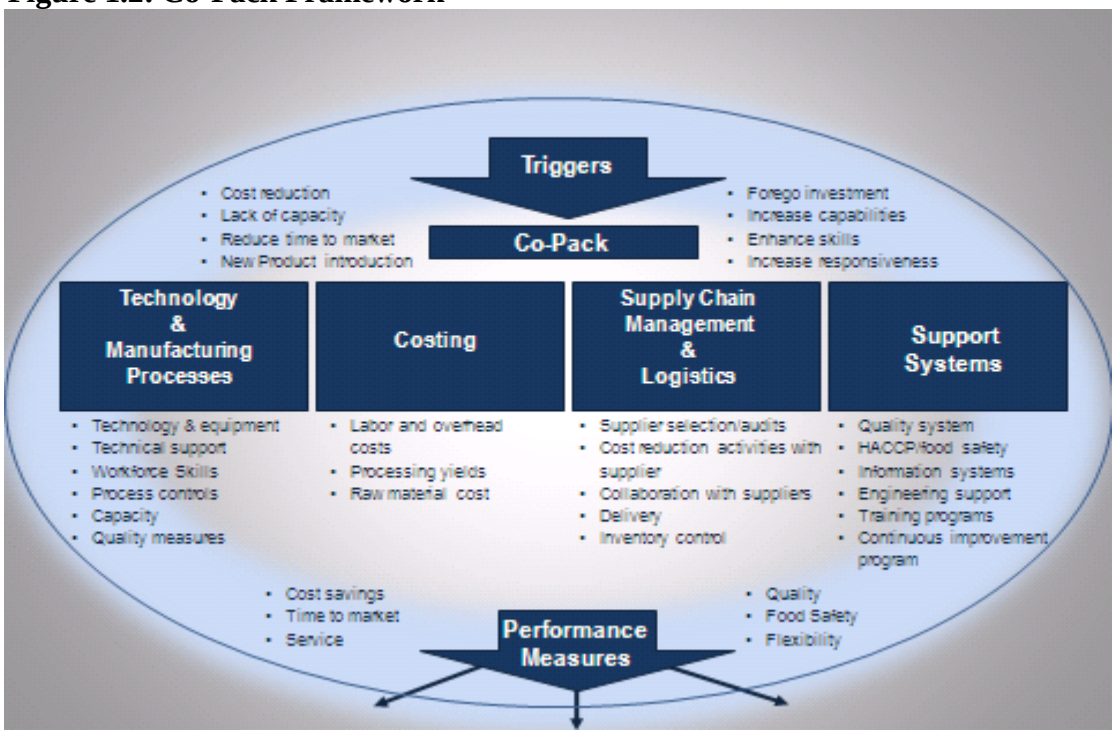


1.4 Contract Manufacturing

The majority of Johnsonville's products are produced in house but a network of contract manufacturers or co-packers was developed in the mid-1990s to keep pace with the company's rapid growth. Through the years, the network evolved with the company's changing needs and now includes ten firms providing a broad range of manufacturing capabilities. The majority of the co-pack firms are located in the upper Midwest.

A variety of factors and considerations affect the decision to produce or outsource. The first consideration is always the product and not all products are candidates for co-packing. As a general guide, co-packers are used for production of non-core products, seasonal production of qualified products, and new product startups requiring significant capital investment. Exceptions to the general guide are considered on a case by case basis and dependent on business needs. Risk management is an outcome of some co-pack situations as it increases the number of production locations but is not part of the strategy. The framework for establishing a co-packing relationship is illustrated in Figure 1.2. This thesis will address the costing or finance element of the framework.

Figure 1.2: Co-Pack Framework



1.5 Problem Statement

This thesis uses a net present value model to evaluate options for adding smoked sausage production capacity. The model will evaluate three options: constructing a facility in Wisconsin; new plant construction in Kansas; and outsourcing production. The model will consider initial capital investment, manufacturing costs and logistics costs to determine the most profitable means to add production capacity.

The theory or hypothesis is that a strategy that combines outsourcing and new construction may be needed to support the investment required to secure sufficient long-term production capacity. The production needs for the next few years exceed existing capacity but may not be enough to justify an investment in a new facility. Outsourcing production for several

years may be required so significant volume is available during the early years of the investment.

All data used in the model were sourced from various Johnsonville functions. The company has operations in Wisconsin and Kansas so labor, utilities and logistics information are readily available. The production process and equipment specified for the new facilities were modeled after an existing process so capital expenditures were defined by engineering and manufacturing teams in conjunction with equipment vendors. Data used for the cost of goods, such as raw material usage, processing yields and packaging supplies were modeled after existing processes. Raw material and finished good freight rates were provided by the Johnsonville transportation team. The data are used to calculate net cash flows and discount them back to present value.

In the event the recommendation is to outsource production, a sub-objective is to define at what volume level, if any, can investment be justified to build a factory. For example, if capacity is exceeded by 2,000,000 pounds in year one and investment cannot be justified, could it be justified at 10,000,000 pounds? The model will include scenarios and sensitivity analysis to answer what-if questions. This information will be the basis for formulating an exit strategy from the contract manufacturer.

This thesis will deliver a detailed analysis and recommendation for the most profitable method of adding production capacity for smoked sausage products both short and long term.

CHAPTER II: LITERATURE REVIEW

Bankard, et.al. (2009) wrote a business plan for the startup of a diabetes center for Mid Atlantic Medical Center (MAMC). Their paper addressed several business categories including target market, marketing strategy, operations, success factors and financial analysis. A cornerstone of their business plan is a "build vs. buy" analysis where net present value was one of three financial methods used to evaluate the investment. The internal rate of return and payback period analyses were also used.

The options the authors evaluated were to "build" a diabetes clinic within MAMC or "buy" a franchise offered by the Joslin Center, a highly reputable diabetes center affiliated with the Harvard Medical School. Along with the financial analysis, consideration was given too many other factors detailed in Table 2.1. The net present value and other financial measures suggest the correct decision was to build and not buy. However, due to non-financial factors, the authors recommended a buy model.

Table 2.1: Build versus Buy Advantages

Overview of Advantages in Build vs. Joslin Buy Models		
	Build Model	**Joslin-Buy Model**
Speed of implementation		✓
Riskiness of model		
Competitive Risk		✓
Market Risk		✓
Execution Risk		✓
Capitalization Risk		✓
Increased patient volumes		✓
Recruitment and retention advantage		✓
National name brand recognition		✓
Adherence to standardized practice model and KPIs		✓
Standardized Education		✓
Experienced implementation of model		✓
Ease of exit		✓
Year Five Financial Projections (with Spillover Revenue)		
Revenue		✓
Cumulative net income		✓
Cash flows		✓
Contribution margin		✓
Payback	✓	
Breakeven	✓	
NPV	✓	

Source: (Bankard, et al. 2009)

Cavinato (1991) reviews a method that facilitates the "make or buy' decision. Cavianato discusses how managers at all levels of the supply chain are constantly analyzing whether it is more cost effective for the firm to outsource or perform its own services or production. While this analysis has been somewhat common for procurement and production functions

for decades, it is relatively new for logistics managers. However, whether the "make or buy" choice is logistics related or production related, the decision process is the same. The key to the decision is to compare costs incurred by all functions with the current situation and the alternative.

Cavinato (1991) describes three essential elements to include in the financial analysis. The first is the after-tax cash impact of the cash outlay. This is a current expense that will have a tax deduction during the following year. It is calculated by taking the cash outlay times (1 – tax rate of the firm). The second essential element is the after-tax cash impact of a non-cash expense such as depreciation. This is the amount of depreciation times the firms tax rate. The final element is the present value (PV) of cash flows. This element of the analysis uses a company specified discount rate to address the time and opportunity effect of revenues and expenses in future years.

In a paper by Bartel, Lach, and Sicherman (2009), they present a model where the probability of outsourcing production increases with the firm's expectation of technological change. They discuss that in an environment of rapidly changing production technology, firms have less time to amortize their sunk cost in equipment. Therefore, outsourcing to firms that are technologically advanced may be a less costly option than producing in-house. The percent of firms outsourcing has risen from 35% in 1990 to 43% in 2002 indicating that outsourcing is increasing.

A firm's spending on R&D is linked to its desire to outsource. Companies that invest heavily in R&D expect and rely on technology change and innovation to set their business apart from the competition. These businesses tend to outsource more than those who invest

little in R&D. It is also possible that another link between outsourcing and technological change could be advancements in the internet and other communication technologies that have reduced resource requirements and the cost to source and manage vendors.

There appears to be a clear relationship between technological change and outsourcing, so industries and businesses operating in an environment of constant change and innovation may find that outsourcing is the least costly way to keep pace.

CHAPTER III: THEORETICAL MODEL

The smoked sausage industry is very competitive. As raw material costs continue to rise, firms need to balance margin and market share decisions. Lower margins can result in fewer funds available for trade and marketing spending. During times of high raw material costs, manufacturers heighten their efforts to improve margins through cost savings, efficiency enhancements and prudent capital management. Outsourcing is often considered as an alternative to large capital investments. Many factors go into the decision making process when evaluating capital investment versus outsourcing but a sound financial analysis is imperative. Primary to the financial analysis is the net present value calculation. There are other decision tools such as Internal Rate of Return (IRR) and payback period that are also discussed.

3.1 Net Present Value (NPV)

Central to evaluating capital projects for most firms is the NPV calculation. NPV establishes the expected present value of profit and is a measure of net cash returns expressed in today's dollars. Under normal circumstances, most people agree that a dollar today is worth more than a dollar tomorrow because money in-hand can be used to create wealth in the future. Recognizing the time value of money is important to the process of making investment decisions that create wealth.

The NPV calculation adds discounted future cash flows resulting from an investment and subtracts the initial investment as shown in equation 1.

$$NPV = \frac{CF_1}{1+r} + \frac{CF_2}{(1+r)^2} + \frac{CF_3}{(1+r)^3} + \frac{CF_4}{(1+r)^4} - I_0 \qquad (1)$$

where CF_i is the cash flow for a given year i, r is the discount rate or the minimum rate of return on investment, and I_0 is initial investment

When the resulting NPV is zero or greater, the firm is better off investing in the project than doing nothing. When evaluating mutually exclusive projects, it is optimal to go with the project with the highest NPV assuming the time horizon is the same for all projects. Net present values increase as discount rates decrease (Brav, et al. 1999).

The discount rate is a key variable in the NPV calculation and is used to move future cash flows to the present. How the discount rate is determined varies from firm to firm and may vary from project to project within a firm. At a minimum, a discount rate is the least amount a firm will accept as a return on an investment. Often a discount rate is based on the cost of capital or cost of debt. A premium is added based on the riskiness of the investment. Another common method is to consider the reinvestment rate that can be defined as the average rate of return on a firm's investments. This is useful when capital is constrained and a firm chooses between multiple projects. A discount rate based on the reinvestment rate reflects the opportunity cost of investment.

As indicated in equation 1, the discount rate is used in the NPV calculation in the denominator of the present value calculation of cash flow. For example, if a ten year project with an 18% discount rate has a cash inflow in year two of \$15,000, the present value of year two's inflow would be $\$15{,}000/(1+0.18)^2$ or \$10,773. The same cash inflow

in year three would have a present value of $\$15{,}000/(1+0.18)^3$ or \$9,129. Table 3.1 below depicts the present values and NPV of a ten year investment assuming a \$50,000 initial investment and an 18% discount rate.

Table 3.1: Present Values and NPV

Period	Cash Flow	Present Value Factor $1/(1+.18)^n$	Present value
0	($50,000)	1.0	($50,000.0)
1	$15,000	0.847	$12,711.9
2	$15,000	0.718	$10,772.8
3	$15,000	0.609	$9,129.5
4	$15,000	0.516	$7,736.8
5	$15,000	0.437	$6,556.6
6	$15,000	0.370	$5,556.5
7	$15,000	0.314	$4,708.9
8	$15,000	0.266	$3,990.6
9	$15,000	0.225	$3,381.8
10	$15,000	0.191	$2,866.0
		NPV	$17,411.3

3.2 Other Financial Tools

NPV and Internal Rate of Return (IRR) are related in that both calculations use the time value of money. IRR is essentially the discount rate used for a project where the NPV of costs is equal to the NPV of the cash flows, or a breakeven interest rate. For example, an investment with a discount rate of 8.0% resulting in a NPV of \$0.00 has an IRR of 8.0%. If the project's NPV is negative, the IRR is lower than 8.0%, and if the NPV is greater than zero the IRR is higher than 8.0%. IRR is a feasible tool to compare projects when the size of the projects is equal. In such a case, the project with the highest IRR would be pursued. It can also be complimentary to the NPV calculation when comparing two different sized and lengths of projects. The NPV calculation result is a dollar value. So if two projects

have similar NPV results but one has a much higher investment requirement, it may be advantageous to know the rate of return. The IRR for the project in Table 3.1 is 27.3%.

The payback period is another financial tool considered by some firms when evaluating investments. It is often used due to its ease of use and simplicity in understanding. The payback period measures the length of time required for a project to return the initial investment. All factors being equal between alternative projects, the shorter payback period project is preferred. This method is useful if a firm requires an investment be paid back within a specific number of years but otherwise has limited use. The payback period for the project in Table 3.1 is four years.

3.3 Financial Tool Pitfalls

The financial tool used by a firm is dependent on the firm's criteria for approving investment in capital projects. There are pros and cons to each tool and each has pitfalls. A pitfall of the NPV calculation is that it does not provide an overall percentage gain of a project relative to the investment. The IRR method provides a return relative to the investment but has its own pitfalls. The most notable is that it does not address the real reason for investing which is to create wealth. An IRR calculation does not account for projects of different scale or varying time horizons, therefore, cannot be used for evaluating mutually exclusive projects. The payback period is the least useful of these methods. It does not account for time value of money or opportunity cost. Also, the payback period or cutoff date is when the analysis ends so good long term projects risk being overlooked because cash flows after the cut-off date are not considered.

Each of the methods has pitfalls which is why most firms use a combination of tools. However, as stand-alone tools, IRR and payback period have more serious shortcomings than the NPV. The NPV calculation is the recommended method for evaluating investments and is used by 75% of Fortune 500 firms (Brealey, Meyers and Allen 2008).

CHAPTER IV: DATA AND METHODS

Johnsonville currently has operations at the sites being considered for the "make" option. Holton, KS is targeted as an option and current manufacturing operations include sow slaughter, pre-rigor pork production and uncooked sausage production (i.e. brats, breakfast sausage and roll sausage). A large portion of the pre-rigor pork produced in Kansas is shipped to Wisconsin for further processing. Sheboygan Falls, WI is the other location being considered. Johnsonville's headquarters is located in Sheboygan Falls and is the company's primary manufacturing site. One hundred percent of Johnsonville's smoked cooked sausage is currently made in Sheboygan Falls.

Data used for the analyses were obtained from Johnsonville sources. Assumptions for the Kansas analysis were based on existing data when applicable such as for labor and utilities, and in other cases assumptions were made based on company knowledge. Data for the Wisconsin site analysis was pulled from the current Wisconsin smoked sausage operation and adjusted to accommodate the proposed process and line layout. Data for the "buy" alternative were received from a sausage manufacturer who will be referred to from this point forward as the co-packer. The co-packer has advanced manufacturing technology and is prequalified to produce Johnsonville's products.

4.1 Project Objective

The objective of this project is to address the financial element of a "make or buy" analysis using a NPV calculation. The project specifically addresses Johnsonville's need to expand production capacity for smoked cooked sausage beyond 63 million pounds to meet increasing demand. The options are to add in-house production capacity with a major plant investment in one of two locations or partner with a co-packer. The investment in-house

would create 26 million pounds of additional capacity. The co-packer option would be a "buy" alternative and would involve outsourcing production as needed.

The data obtained from Johnsonville include projected sales volume, fixed and variable expenses by location, production rates, plant and equipment cost, and freight.

4.2 Sales Volume

The sales volume is projected to increase 5.0% year-over-year. The baseline volume is 59 million pounds. Table 4.1 illustrates the demand in pounds for a ten year period beyond the baseline period.

Table 4.1: Volume Demand in Pounds

Period	Pounds
Baseline	59,000,000
Year 1	61,950,000
Year 2	65,047,500
Year 3	68,299,875
Year 4	71,714,869
Year 5	75,300,612
Year 6	79,065,643
Year 7	83,018,925
Year 8	87,169,871
Year 9	91,528,365
Year 10	96,104,783

4.3 Production Model

The production model is based on the existing facility reaching its production capacity in year one and continuing to operate at full capacity for the duration of the project period. All excess volume will be absorbed by one of the three future options. The excess volume grows from approximately 2.0 million pounds in year one to 36.10 million pounds in year

ten. Table 4.2 illustrates the capacity requirements over a ten year period. Year eight is when the Sheboygan and Holton investment options reach their production capacity.

Table 4.2: Production Plan at Current Plant and Future Options

		Option 1	Option 2	Option 3
Period	**Current Plant**	**Sheboygan Plant**	**Holton Plant**	**Co-Pack**
	Pounds			Pounds
Baseline	59,000,000	0	0	0
Year 1	60,000,000	1,950,000	1,950,000	1,950,000
Year 2	60,000,000	5,047,500	5,047,500	5,047,500
Year 3	60,000,000	8,299,875	8,299,875	8,299,875
Year 4	60,000,000	11,714,869	11,714,869	11,714,869
Year 5	60,000,000	15,300,612	15,300,612	15,300,612
Year 6	60,000,000	19,065,643	19,065,643	19,065,643
Year 7	60,000,000	23,018,925	23,018,925	23,018,925
Year 8	60,000,000	26,250,000	26,250,000	27,169,871
Year 9	60,000,000	26,250,000	26,250,000	31,528,365
Year 10	60,000,000	26,250,000	26,250,000	36,104,783

4.4 Labor Cost

Johnsonville's actual labor data were used for the analysis on a per cwt basis as shown in Table 4.3. Labor cost for the Sheboygan and Holton sites vary based on labor market variation. The Sheboygan area historically has had low unemployment that has driven hourly labor rates upward. The equipment and process for the two sites are identical, therefore, production rates are assumed to be the same. There are no Johnsonville labor costs for the co-pack option. Labor for this option is captured in the co-pack fee.

Table 4.3: Labor Costs for the Sheboygan, Holton, and Co-Pack Options

	Sheboygan	**Holton**	**Co-Pack**
Labor Cost Per cwt.	$ 9.31	$ 8.47	$ -

4.5 Fixed and Variable Expenses

Fixed and variable expenses for the three options are also based on Johnsonville data. Assumptions were made on timing of certain fixed expenses based on timing of volume.

This resulted in fixed expenses being lower in the early years of the project. Examples of Johnsonville fixed expense held lower in the early years of the project are replacement parts, utilities, outside services, supervisory and maintenance payroll, and department budgets. Some of these items may be viewed as variable to some firms but Johnsonville categorizes them as fixed.

It is not until year six of the project when the projected volume reaches a level requiring a second shift to be staffed. This is when the fixed expenses are fully loaded into the plan. The production capacity at this fixed expense level is assumed to be 26 million pounds. It is important to note that depreciation is a separate line item and not included in the fixed cost line.

Fixed expenses for the co-pack option consist of the various support systems for the business and the Johnsonville co-pack department budget. These expenses increase annually from year one through year five and reach the maximum level in year six.

4.6 Freight Rates

An evaluation of freight rates was performed to understand cost to the incoming pork raw material and the outbound finished goods freight. The pork originates primarily from Midwest locations that fall in between the locations being evaluated. Finished goods are shipped to one of four Johnsonville distribution centers throughout the U.S. The proximity of the production sites to the distribution centers does not vary significantly. After modeling these costs, it was determined the difference was negligible so freight cost variation was not included in the overall analysis. Raw material freight is accounted for in

the pork cost and finished goods freight is accounted for in the "supply chain" line item on the profit and loss for all three options.

4.7 Capital and Depreciation

The Sheboygan and Holton options include significant capital expense including equipment and building. The line layout and equipment for the two options is the same so the equipment investment is very similar. The investment is about $11.8 million for each location. The building cost is higher at Holton - $6.0 million compared to $4.0 million at Sheboygan. Additional square footage is needed in Holton for welfare areas and the formulation process. In a ready-to-eat (RTE) facility, separate welfare areas are needed for employees working with raw meat and those working with cooked meat. Holton currently processes raw sausage only so the new addition must accommodate the welfare requirements for a RTE facility. The Sheboygan location already produces cooked sausage so appropriate welfare areas already exist.

The model includes two different depreciation schedules. The equipment schedule is a straight line seven year depreciation and the building is 20 year straight line. There is no salvage value assumed in the model. The annual depreciation for the equipment is $1.68 million for Sheboygan and $1.69 million for Holton. The building depreciation is $200,000 and $300,000 for Sheboygan and Holton respectively.

4.8 Co-Pack Information

A co-packer has been identified and approved as a long-term option to produce smoked cooked sausage. The co-packer's manufacturing process is technologically advanced and is similar to the process and equipment that Johnsonville specified for the Sheboygan and

Holton options. The process is centered on cook in bag (CIB) which eliminates the possibility of post-cook contamination. The process meets USDA's Alternative 1 for *Listeria monocytogenes* control in Ready-to-Eat meat and poultry products. This standing with the USDA requires the least amount of USDA product sampling and oversight.

Johnsonville and the co-packer have negotiated pricing based on various volume levels. There are two elements to the pricing formula. There is the materials/supplies and the manufacturing fee. The raw materials and packaging supplies will be passed through to Johnsonville at the co-packers actual cost. Meat prices are updated weekly and all other supplies can be updated monthly. The co-packers manufacturing fee, which includes fixed and variable manufacturing expenses plus profit, is referred to in the P&L as the co-pack fee. Table 4.3 illustrates the tiered co-pack fee structure.

Table 4.4: Co-Packer Tiered Pricing Schedule Per CWT

Annual Volume in lbs.	**>25MM**	**>15MM**	**>10MM**	**>5.0MM**	**>2.5 MM**
Processing Fee	$ 35.5	$ 36.2	$ 38.5	$ 43.6	$ 52.7

4.9 Profit and Loss Statements

The data described above were used in a profit and loss statement for each manufacturing option studied (Tables 4.5, 4.6 and 4.7). The results of these statements were used to arrive at cash flows for the NPV models.

Table 4.5: Sheboygan Profit and Loss

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Line Description							
Pounds Sold	1,950,000	5,047,500	8,299,875	11,714,869	15,300,612	19,065,643	23,018,925
Net Sales	4,582,500	11,861,625	19,504,706	27,529,942	35,956,439	44,804,261	54,094,474
Total Cost of Sales	6,069,423	9,337,704	12,726,968	16,730,335	20,352,859	24,718,787	28,822,666
Gross Profit (Loss)	**(1,486,923)**	**2,523,921**	**6,777,738**	**10,799,607**	**11,946,835**	**20,085,474**	**25,271,807**
Sales, Delivery, Admin	976,755	2,528,293	4,157,407	5,867,978	7,664,077	9,549,980	11,530,180
Operating Margin (Loss)	**(2,463,678)**	**(4,372)**	**2,620,331**	**4,931,629**	**7,939,503**	**10,535,493**	**13,741,628**
Total Common Expenses	292,500	757,125	1,244,981	1,757,230	2,295,092	2,859,846	3,452,839
Operating Profit (Loss)	(2,756,178)	(761,497)	1,375,350	3,174,399	5,644,411	7,675,647	10,288,789
Total Other Expense	0	0	0	0	0	0	0
Pre-tax Net Income (Loss)	**(2,756,178)**	**(761,497)**	**1,375,350**	**3,174,399**	**5,644,411**	**7,675,647**	**10,288,789**

Table 4.6: Holton Profit and Loss

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Line Description							
Pounds Sold	1,950,000	5,047,500	8,299,875	11,714,869	15,300,612	19,065,643	23,018,925
Net Sales	4,582,500	11,861,625	19,504,706	27,529,942	35,956,439	44,804,261	54,094,474
Total Cost of Sales	6,097,931	9,320,792	12,670,655	16,623,262	20,224,646	24,536,006	28,595,078
Gross Profit (Loss)	**(1,515,431)**	**2,540,833**	**6,834,051**	**10,906,679**	**15,731,792**	**20,268,255**	**25,499,395**
Sales, Delivery, Admin	976,755	2,528,293	4,157,407	5,867,978	7,664,077	9,549,980	11,530,180
Operating Margin (Loss)	**(2,492,186)**	**12,540**	**2,676,644**	**5,038,701**	**8,067,716**	**10,718,274**	**13,969,216**
Total Common Expenses	292,500	757,125	1,244,981	1,757,230	2,295,092	2,859,846	3,452,839
Operating Profit (Loss)	(2,784,686)	(744,585)	1,431,663	3,281,471	5,772,624	7,858,428	10,516,377
Total Other Expense	0	0	0	0	0	0	0
Pre-tax Net Income (Loss)	**(2,784,686)**	**(744,585)**	**1,431,663**	**3,281,471**	**5,772,624**	**7,858,428**	**10,516,377**

Table 4.7: Co-Pack Profit and Loss

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Line Description							
Pounds Sold	1,950,000	5,047,500	8,299,875	11,714,869	15,300,612	19,065,643	23,018,925
Net Sales	4,582,500	11,861,625	19,504,706	27,529,942	35,956,439	44,804,261	54,094,474
Total Cost of Sales	2,650,250	6,607,696	10,823,889	15,089,954	19,356,846	24,048,027	28,930,736
Gross Profit (Loss)	**1,932,250**	**5,253,929**	**8,680,817**	**12,439,988**	**16,599,593**	**20,756,234**	**25,163,738**
Sales, Delivery, Admin	976,755	2,528,293	4,157,407	5,867,978	7,664,077	9,549,980	11,530,180
Operating Margin (Loss)	**955,495**	**2,725,636**	**4,523,410**	**6,572,010**	**8,935,516**	**11,206,254**	**13,633,558**
Total Common Expenses	292,500	757,125	1,244,981	1,757,230	2,295,092	2,859,846	3,452,839
Operating Profit (Loss)	662,995	1,968,511	3,278,428	4,814,780	6,640,425	8,346,407	10,180,719
Total Other Expense	0	0	0	0	0	0	0
Pre-tax Net Income (Loss)	**662,995**	**1,968,511**	**3,278,428**	**4,814,780**	**6,640,425**	**8,346,407**	**10,180,719**
Income Taxes							
Net Income (Loss)	662,995	1,968,511	3,278,428	4,814,780	6,640,425	8,346,407	10,180,719

CHAPTER V: NPV MODEL AND SENSITIVITY ANALYSIS

Using the data outlined in chapter four, a NPV model was developed for each manufacturing option. The net incomes from the profit and loss statements were the basis for the cash flows. The data, particularly the volume projections and raw material prices, are based on business assumptions and business planning tools. If these assumptions are incorrect, the NPV results could change substantially. To understand the impact of these key assumptions, sensitivity analyses were performed. Sensitivity analysis was also performed to determine the effect of delaying the investment until substantial volume is available at year one of the project.

5.1 NPV Calculations

Ten year NPV calculations were performed. A table was constructed for each option showing the net cash flows. Net incomes for each year are listed and depreciation is added back to arrive at net cash flows. The co-pack option does not require a capital investment so depreciation is not a factor. The net cash flows were discounted back to time zero using an 18% discount rate to arrive at a NPV. Eighteen percent is Johnsonville's internal cost of capital requirement.

Table 5.1: Sheboygan Cash Flow and NPV for Expected Case

Capital Investment	Start up Expense	Net Income	Depreciation	Net Cash Flow
$ 15,739,300				$ (15,739,300)
	$ 278,478	$ (1,760,101)	$ 1,877,043	$ 116,942
		$ (441,668)	$ 1,877,043	$ 1,435,375
		$ 797,703	$ 1,877,043	$ 2,674,746
		$ 1,841,151	$ 1,877,043	$ 3,718,194
		$ 2,506,544	$ 1,877,043	$ 4,383,586
		$ 4,451,875	$ 1,877,043	$ 6,328,918
		$ 5,967,498	$ 1,877,043	$ 7,844,540
		$ 7,206,238	$ 200,000	$ 7,406,238
		$ 7,206,238	$ 200,000	$ 7,406,238
		$ 7,206,238	$ 200,000	$ 7,406,238
			NPV	**$ 605,703**

Table 5.1 shows the NPV of $605,703 for an investment of $15.74 million in Sheboygan. An IRR was determined for this investment by solving for the discount rate that equates to a zero NPV. The analysis yielded an IRR of 18.86%. The IRR result and positive NPV indicate the Sheboygan project is a profitable investment.

Table 5.2: Holton Cash Flow and NPV for Expected Case

Capital Investment	Start up Expense	Net Income	Depreciation	Net Cash Flow
$ 17,827,575				$ (17,827,575)
	$ 1,133,452	$ (2,272,520)	$ 1,989,654	$ (282,867)
		$ (431,859)	$ 1,989,654	$ 1,557,794
		$ 830,364	$ 1,989,654	$ 2,820,018
		$ 1,903,253	$ 1,989,654	$ 3,892,907
		$ 2,563,480	$ 1,989,654	$ 4,553,133
		$ 4,557,888	$ 1,989,654	$ 6,547,542
		$ 6,099,499	$ 1,989,654	$ 8,089,152
		$ 8,339,479	$ 300,000	$ 8,639,479
		$ 8,339,479	$ 300,000	$ 8,639,479
		$ 8,339,479	$ 300,000	$ 8,639,479
			NPV	**$ (315,483)**

The Holton option as illustrated in table 5.2 is not a sound financial investment. The negative NPV indicates the IRR is less than the discount rate. This is confirmed by solving for the IRR by lowering the discount rate until the NPV equals zero. The IRR is 17.61%. By studying the profit and loss statements and the net cash flows, it can be concluded that the additional $3.0 million investment in capital and start up expense is the major reason for the differing results between the Sheboygan and Holton projects.

Table 5.3: Co-Pack Cash Flow and NPV for Expected Case

Capital Investment	Start up Expense	Net Income	Depreciation	Net Cash Flow
$ -				$ -
	$ 66,585	$ 345,918	$ -	$ 345,918
		$ 1,141,737	$ -	$ 1,141,737
		$ 1,901,488	$ -	$ 1,901,488
		$ 2,792,572	$ -	$ 2,792,572
		$ 3,851,446	$ -	$ 3,851,446
		$ 4,840,916	$ -	$ 4,840,916
		$ 5,904,817	$ -	$ 5,904,817
		$ 7,154,328	$ -	$ 7,154,328
		$ 8,302,000	$ -	$ 8,302,000
		$ 9,507,055	$ -	$ 9,507,055
			NPV	**$ 12,400,620**

Table 5.3 shows a NPV of $12.40 million which is a significant increase over both Sheboygan and Holton options. The result is not surprising because there is no investment; therefore, there is not a negative impact to cash flow. The Sheboygan and Holton options both have large investments affecting cash flows.

5.2 Pork Price Uncertainty

Poor and excellent case models were evaluated for the Sheboygan and Co-Pack projects. The expected case for the Holton project proved not to be a viable investment option but sensitivity analyses were carried out anyway for comparison purposes.

Pork price projections are based on Johnsonville planning tools and are considered to be the expected case. The composite pork price used in the expected model is $62.00 per cwt. However, pork prices routinely fluctuate and factors such as government regulation, feed prices, diseases and export markets all may affect that assumption. The impact could be

positive or negative. For this reason, poor and excellent case NPV models were examined to understand the risk and upside potential. The poor case scenario assumed a composite pork price of $87.00 per cwt compared to $62.00 in the expected case. The Sheboygan project under this scenario has a ten year NPV of -$6.56 million dollars and an IRR of 6.15%. The Co-pack option under the poor case scenario shows a ten year NPV of $4.58 million. Tables 5.4 and 5.5 show the net cash flows by year and NPV for the Sheboygan and Co-pack options, respectively. The NPV for the Holton option is -$7.54 million and is shown in table 5.6. If pork prices reached poor case levels, net finished goods prices would have to increase to $260.00 per cwt or increase 10% from the expected case to achieve a positive NPV with the Sheboygan model. Such an increase could cause a shift downward in demand and loss of market share.

Table 5.4: Sheboygan Net Cash Flow and NPV – Poor Case Pork Prices

Capital Investment	Start up Expense	Net Income	Depreciation	Net Cash Flow
$ (15,739,300)				$ (15,739,300)
	$ 278,478	$ (2,067,239)	$ 1,877,043	$ (190,196)
		$ (1,236,684)	$ 1,877,043	$ 640,359
		$ (509,584)	$ 1,877,043	$ 1,367,459
		$ (4,020)	$ 1,877,043	$ 1,873,023
		$ 661,372	$ 1,877,043	$ 2,538,415
		$ 1,448,907	$ 1,877,043	$ 3,325,950
		$ 2,341,860	$ 1,877,043	$ 4,218,903
		$ 3,071,684	$ 200,000	$ 3,271,684
		$ 3,071,684	$ 200,000	$ 3,271,684
		$ 3,071,684	$ 200,000	$ 3,271,684
			NPV	**$ (6,561,939)**

Table 5.5: Co-Pack Net Cash Flow and NPV – Poor Case Pork Prices

Capital Investment	Start up Expense	Net Income	Depreciation	Net Cash Flow
$ -				$ -
	$ 66,585	$ 38,780	$ -	$ 38,780
		$ 346,721	$ -	$ 346,721
		$ 594,202	$ -	$ 594,202
		$ 947,401	$ -	$ 947,401
		$ 1,441,496	$ -	$ 1,441,496
		$ 1,837,948	$ -	$ 1,837,948
		$ 2,279,180	$ -	$ 2,279,180
		$ 2,874,889	$ -	$ 2,874,889
		$ 3,336,068	$ -	$ 3,336,068
		$ 3,820,307	$ -	$ 3,820,307
			NPV	**$ 4,580,924**

Table 5.6: Holton Net Cash Flow and NPV – Poor Case Pork Prices

Capital Investment	Start up Expense	Net Income	Depreciation	Net Cash Flow
$ 17,827,575				$ (17,827,575)
	$ 1,133,452	$ (2,579,659)	$ 1,989,654	$ (590,005)
		$ (1,226,875)	$ 1,989,654	$ 762,779
		$ (476,922)	$ 1,989,654	$ 1,512,731
		$ 58,082	$ 1,989,654	$ 2,047,735
		$ 718,308	$ 1,989,654	$ 2,707,962
		$ 1,554,920	$ 1,989,654	$ 3,544,573
		$ 2,473,862	$ 1,989,654	$ 4,463,515
		$ 4,204,925	$ 300,000	$ 4,504,925
		$ 4,204,925	$ 300,000	$ 4,504,925
		$ 4,204,925	$ 300,000	$ 4,504,925
			NPV	**$ (7,483,125)**

Just as there are market factors that can cause pork prices to increase, there are factors that can cause pork prices to decline for a significant period of time. An excellent case scenario

was run using a composite pork price of $46.00 per cwt. Under this scenario, the ten year NPV for the Sheboygan project was $5.25 million dollars and the IRR was 24.78%. The NPV for the Co-pack option was $17.47 million dollars. Tables 5.7 and 5.8 show the net cash flow by year and NPV for these scenarios. In both the Sheboygan and Co-Pack options there is tremendous upside in a declining pork price market. The Holton option, with a NPV $4.33 million, also shows an upside as illustrated in Table 5.9.

Table 5.7: Sheboygan Net Cash Flow and NPV – Excellent Case Pork Prices

Capital Investment	Start up Expense	Net Income	Depreciation	Net Cash Flow
$ (15,739,300)				$ (15,739,300)
	$ 278,478	$ (1,560,982)	$ 1,877,043	$ 316,060
		$ 73,742	$ 1,877,043	$ 1,950,785
		$ 1,645,220	$ 1,877,043	$ 3,522,263
		$ 3,037,380	$ 1,877,043	$ 4,914,423
		$ 3,702,772	$ 1,877,043	$ 5,579,815
		$ 6,398,706	$ 1,877,043	$ 8,275,749
		$ 8,318,006	$ 1,877,043	$ 10,195,049
		$ 9,886,678	$ 200,000	$ 10,086,678
		$ 9,886,678	$ 200,000	$ 10,086,678
		$ 9,886,678	$ 200,000	$ 10,086,678
			NPV	**$ 5,252,502**

Table 5.8: Co-Pack Net Cash Flow and NPV – Excellent Case Pork Prices

Capital Investment	Start up Expense	Net Income	Depreciation	Net Cash Flow
$ -				$ -
	$ 66,585	$ 545,036	$ -	$ 545,036
		$ 1,657,147	$ -	$ 1,657,147
		$ 2,749,005	$ -	$ 2,749,005
		$ 3,988,801	$ -	$ 3,988,801
		$ 5,413,823	$ -	$ 5,413,823
		$ 6,787,747	$ -	$ 6,787,747
		$ 8,255,326	$ -	$ 8,255,326
		$ 9,928,698	$ -	$ 9,928,698
		$ 11,521,425	$ -	$ 11,521,425
		$ 13,193,787	$ -	$ 13,193,787
			NPV	**$ 17,470,147**

Table 5.9: Holton Net Cash Flow and NPV – Excellent Case Pork Prices

Capital Investment	Start up Expense	Net Income	Depreciation	Net Cash Flow
$ 17,827,575				$ (17,827,575)
	$ 1,133,452	$ (2,073,402)	$ 1,989,654	$ (83,748)
		$ 83,551	$ 1,989,654	$ 2,073,205
		$ 1,677,881	$ 1,989,654	$ 3,667,535
		$ 3,099,482	$ 1,989,654	$ 5,089,136
		$ 3,759,709	$ 1,989,654	$ 5,749,362
		$ 6,504,719	$ 1,989,654	$ 8,494,373
		$ 8,450,007	$ 1,989,654	$ 10,439,661
		$ 11,019,919	$ 300,000	$ 11,319,919
		$ 11,019,919	$ 300,000	$ 11,319,919
		$ 11,019,919	$ 300,000	$ 11,319,919
			NPV	**$ 4,331,316**

5.3 Volume Uncertainty

Johnsonville has experienced significant growth over the past several years. The baseline or expected case model used a year over year growth rate of 5% which is consistent with

recent history and the company's growth plans. However, there are regional and national brands that create significant competition. Changes to a competitor's strategy could impact Johnsonville's sales volume up or down. A shift in customer's strategy could also have an impact. For example, if more retailers implement private label strategies, national and regional brand volume could decline. To determine the affects of more or less volume, poor and excellent case scenarios were analyzed. The poor case scenario assumed that volume would only increase 1% year over year and the excellent case scenario assumed 8% growth year over year. Under the poor case scenario the NPV result for the Sheboygan project was -$13.28 million. The IRR was also negative. This is a direct result of under utilization of the investment and is a serious risk to consider. The Co-pack option is less risky as the NPV under the poor case scenario is $1.21 million. Tables 5.10 and 5.11 show the net cash flow by year and NPV for poor case volume scenarios. The Holton option poses the same risk as the Sheboygan option due to the high investment. Table 5.12 shows a NPV of -$15.05 million for Holton.

Table 5.10: Sheboygan Net Cash Flow and NPV – Poor Case Volume

Capital Investment	Start up Expense	Net Income	Depreciation	Net Cash Flow
$ (15,739,300)				$ (15,739,300)
	$ 278,478	$ (2,488,425)	$ 1,877,043	$ (611,382)
		$ (2,257,474)	$ 1,877,043	$ (380,431)
		$ (2,032,680)	$ 1,877,043	$ (155,637)
		$ (1,805,638)	$ 1,877,043	$ 71,405
		$ (1,576,325)	$ 1,877,043	$ 300,717
		$ (1,344,720)	$ 1,877,043	$ 532,323
		$ (1,110,798)	$ 1,877,043	$ 766,245
		$ 98,148	$ 200,000	$ 298,148
		$ 336,771	$ 200,000	$ 536,771
		$ 577,781	$ 200,000	$ 777,781
			NPV	**$ (13,280,011)**

Table 5.11: Co-Pack Net Cash Flow and NPV – Poor Case Volume

Capital Investment	Start up Expense	Net Income	Depreciation	Net Cash Flow
$ -				$ -
	$ 66,585	$ (38,619)	$ -	$ (38,619)
		$ 36,659	$ -	$ 36,659
		$ 155,345	$ -	$ 155,345
		$ 275,217	$ -	$ 275,217
		$ 396,289	$ -	$ 396,289
		$ 518,571	$ -	$ 518,571
		$ 642,075	$ -	$ 642,075
		$ 766,815	$ -	$ 766,815
		$ 892,802	$ -	$ 892,802
		$ 1,170,058	$ -	$ 1,170,058
			NPV	**$ 1,208,329**

Table 5.12: Holton Net Cash Flow and NPV – Poor Case Volume

Capital Investment	Start up Expense	Net Income	Depreciation	Net Cash Flow
$ 17,827,575				$ (17,827,575)
	$ 1,133,452	$ (3,017,429)	$ 1,989,654	$ (1,027,775)
		$ (2,289,008)	$ 1,989,654	$ (299,355)
		$ (2,059,084)	$ 1,989,654	$ (69,430)
		$ (1,826,860)	$ 1,989,654	$ 162,794
		$ (1,592,313)	$ 1,989,654	$ 397,340
		$ (1,355,421)	$ 1,989,654	$ 634,232
		$ (1,116,161)	$ 1,989,654	$ 873,493
		$ 105,492	$ 300,000	$ 405,492
		$ 349,561	$ 300,000	$ 649,561
		$ 596,072	$ 300,000	$ 896,072
			NPV	**$ (15,053,805)**

Under the excellent case scenario where volume was increased 8% year over year, the NPV is $9.94 million and $23.07 million for the Sheboygan and Co-pack options, respectively. The IRR for the Sheboygan project is 31.25%. The net cash flows by year and NPV for these scenarios are shown in Tables 5.13 and 5.14. Table 5.15 shows a NPV of $6.52 million for the Holton option.

Table 5.13: Sheboygan Net Cash Flow and NPV – Excellent Case Volume

Capital Investment	Start up Expense	Net Income	Depreciation	Net Cash Flow
$ (15,739,300)				$ (15,739,300)
	$ 278,478	$ (1,099,006)	$ 1,877,043	$ 778,036
		$ 1,312,566	$ 1,877,043	$ 3,189,609
		$ 3,400,683	$ 1,877,043	$ 5,277,726
		$ 5,612,752	$ 1,877,043	$ 7,489,795
		$ 8,104,776	$ 1,877,043	$ 9,981,819
		$ 8,081,790	$ 1,877,043	$ 9,958,833
		$ 8,058,575	$ 1,877,043	$ 9,935,618
		$ 9,007,812	$ 200,000	$ 9,207,812
		$ 8,984,130	$ 200,000	$ 9,184,130
		$ 8,960,211	$ 200,000	$ 9,160,211
			NPV	**$ 9,938,821**

Table 5.14: Co-Pack Net Cash Flow and NPV – Excellent Case Volume

Capital Investment	Start up Expense	Net Income	Depreciation	Net Cash Flow
$ -				$ -
	$ 66,585	$ 694,959.02	$ -	$ 694,959
		$ 2,020,098.44	$ -	$ 2,020,098
		$ 3,455,833.09	$ -	$ 3,455,833
		$ 5,149,066.77	$ -	$ 5,149,067
		$ 7,089,984.78	$ -	$ 7,089,985
		$ 9,049,265.13	$ -	$ 9,049,265
		$ 11,064,974.88	$ -	$ 11,064,975
		$ 13,241,941.40	$ -	$ 13,241,941
		$ 15,593,065.24	$ -	$ 15,593,065
		$ 18,132,279.00	$ -	$ 18,132,279
			NPV	**$ 23,073,356**

Table 5.15: Holton Net Cash Flow and NPV – Excellent Case Volume

Capital Investment	Start up Expense	Net Income	Depreciation	Net Cash Flow
$ 17,827,575				$ (17,827,575)
	$ 1,133,452	$ (1,596,298)	$ 1,989,654	$ 393,355
		$ 1,029,548	$ 1,989,654	$ 3,019,202
		$ 2,967,183	$ 1,989,654	$ 4,956,837
		$ 5,027,490	$ 1,989,654	$ 7,017,144
		$ 7,360,002	$ 1,989,654	$ 9,349,656
		$ 7,360,002	$ 1,989,654	$ 9,349,656
		$ 7,360,002	$ 1,989,654	$ 9,349,656
		$ 8,340,001	$ 300,000	$ 8,640,001
		$ 8,340,001	$ 300,000	$ 8,640,001
		$ 8,340,001	$ 300,000	$ 8,640,001
			NPV	**$ 6,519,488**

5.4 Sensitivity of Beginning Date

The Sheboygan and co-pack options were the focus of the beginning date analysis. The objective was to determine the effect on the Sheboygan NPV when greater volume is available during the early periods of the project and to compare these results to the co-pack option. Four scenarios were run for this analysis. It is recognized that inflation will occur so to mitigate this affect the model assumes real prices as opposed to nominal prices. The first scenario delays the project by one year so the volume projected for year two in the expected case is year one volume and the expected case year three volume becomes year two volume and so on. The second scenario (two year delay) uses the expected case year three volume as year one volume and expected case year four volume as year two volume and so on. Scenarios three and four follow the same logic. Table 5.16 shows the year by year volume used to test each scenario. The annual Sheboygan production capacity is reached at 26.25 million pounds for a two production shift operation. The annual single

shift capacity is assumed to be between 13.5 and 15.0 million pounds. The volume for the co-pack alternative is limited to 26.25 million pounds to match the Sheboygan option so the results can be compared.

Table 5.16: Volumes for Beginning Date Sensitivity

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Year 1	5,047,500	8,299,875	11,714,869	15,300,612
Year 2	8,299,875	11,714,869	15,300,612	19,065,643
Year 3	11,714,869	15,300,612	19,065,643	23,018,925
Year 4	15,300,612	19,065,643	23,018,925	26,250,000
Year 5	19,065,643	23,018,925	26,250,000	26,250,000
Year 6	23,018,925	26,250,000	26,250,000	26,250,000
Year 7	26,250,000	26,250,000	26,250,000	26,250,000
Year 8	26,250,000	26,250,000	26,250,000	26,250,000
Year 9	26,250,000	26,250,000	26,250,000	26,250,000
Year 10	26,250,000	26,250,000	26,250,000	26,250,000

The data from Table 5.16 were entered into the models and NPVs were generated for each scenario. The results clearly illustrate a positive impact to the NPV when there is greater volume during the early periods of the project. Table 5.17 shows how the NPVs increase each year the project is delayed.

Table 5.17: NPV Results for Beginning Date Sensitivity

Project Start Year	Beginning Year Volume	NPV Sheboygan	NPV Co-Pack
Year 2	5,047,500	$4,545,905	$14,557,446.99
Year 3	8,299,875	$8,214,908	$17,334,408.53
Year 4	11,714,869	$11,494,016	$19,967,365.68
Year 5	15,300,612	$14,479,085	$22,319,099.40

5.5 Summary of Sensitivity Analyses

The sensitivity analyses indicate that changes to pork prices and volume projections pose risk to investing in the Sheboygan project. The Holton option was deemed a high risk investment under the expected case scenario so as expected it poses even more risk when changing these key variables. The co-pack option mitigates risk associated with upward movement in pork prices and downward movement in volume because there is not an upfront investment. Table 5.18 summarizes these results. Finally, the beginning date sensitivity analysis indicates there is a significant financial benefit to delaying the start of the Sheboygan project. For example, if the Sheboygan project is delayed until year five when the volume reaches the annual capacity for a single production shift, the expected case NPV of $605,703 increases to $14.5 million.

Table 5.18: NPV Results Summary for Pork Price and Volume Sensitivity

Scenario	Poor Case	Excellent Case
Sheboygan		
Pork Price	$ (6,561,939)	$ 5,252,502
Volume	$ (13,280,011)	$ 9,938,821
Co-Pack		
Pork Price	$ 4,580,924.14	$ 17,470,147.15
Volume	$ 1,208,328.76	$ 23,073,356.24
Holton		
Pork Price	$ (7,483,124.92)	$ 4,331,315.70
Volume	$ (15,053,804.56)	$ 6,519,488.45

CHAPTER VI: CONCLUSIONS

6.1 Recommendation

The objective of this thesis is to use a net present value model to evaluate options for adding smoked sausage production capacity. Three options were identified which include investment in Sheboygan, WI, Holton, KS, or outsourcing production.

The NPV analysis shows that the investment in the Holton project is not a sound investment so it should not be considered. The Sheboygan option has a positive NPV with an 18.86% IRR. This is a viable investment option under expected business case assumptions and gives Johnsonville 100% control of its production. However, there are risks. The investment required to support this project is $15.74 million dollars. The sensitivity analyses indicate the project cannot withstand increasing raw material prices or reduced volume growth. A worst case scenario would be if pork prices increase causing volume to decrease.

On a pure financial basis, the best option is to proceed with the co-pack alternative and not invest money to add cooked sausage capacity. The cost to co-pack is competitive and provides Johnsonville the most flexibility if raw material and or volume projections change. However, to proceed with the co-pack option requires that almost 40% of the cooked sausage volume be outsourced during the latter years of this project placing heavy reliance on the contract manufacture.

As with most business decisions, there are factors in addition to financial factors that must be considered in the decision making process. In this case, risk needs to be considered. Currently Johnsonville produces 99% of its retail cooked sausage in Sheboygan, WI and

does not have a secondary supply. The co-pack option allows Johnsonville to create a secondary production source and mitigate some risk in the event there is a production shut down at its primary production location. On the other hand, when relying solely on the co-pack option there is risk associated with an extraordinary amount of production occurring away from Johnsonville's direct control.

In consideration of both financial and risk factors, the recommendation is to outsource production until year five when volume reaches 15.0 million and is sufficient to sustain one production shift. At this point, the Sheboygan project delivers a NPV of $14.5 million and the outsourced volume does not exceed 20%. This recommendation is financially sound while mitigating risk of changes to key variables and the risks associated with heavy reliance on an external production source.

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